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In reply, please refer to:
EMD / CWB

DATE: December 22, 2003

NPDES PERMIT NO.: HI 0020109

REVISED FACT SHEET: APPLICATION FOR RENEWAL OF A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO THE WATERS OF THE UNITED STATES AND FOR A ZONE OF MIXING

FACILITY: WAIANAE WASTEWATER TREATMENT PLANT

PERMITEE: CITY AND COUNTY OF HONOLULU
DEPARTMENT OF ENVIRONMENTAL SERVICES

FACILITY ADDRESS
Waianae Wastewater Treatment Plant
86-100 Farrington Highway
Waianae, Hawaii 96792

PERMITTEE MAILING ADDRESS
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Department of Environmental Services
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PERMIT STATUS

NPDES Permit No. HI 0020109 and Zone of Mixing (ZOM) was issued on September 30, 1999 and expired on September 30, 2003. The Director of Health received an NPDES permit and ZOM application, dated February 27, 2003, on March 17, 2003, to continue NPDES permit coverage. The existing NPDES permit was administratively extended on September 22, 2003 until a new permit can be issued.

The City and County of Honolulu (Permittee) submitted a Notice of Intent (NOI) for NPDES general permit coverage to discharge storm water associated with industrial activity. The existing individual permit covers this discharge, however, the Permittee has opted to have separate permits for the discharges of secondary treated wastewater and storm water associated with industrial activity because compliance for these discharges are handled by different divisions within the Department of Environmental Services.

The Director of Health proposes to issue a permit to the City and County of Honolulu (Permittee) to discharge to the waters of the State, including a ZOM, until June 30, 2008, and has included in the draft permit those terms and conditions which he has determined are necessary to carry out the provisions of the Federal Water Pollution Control Act (P.L. 92-500), Federal Clean Water Act of 1977 (P.L. 95-217), and Hawaii Revised Statutes, Chapter 342D.

FACILITY LOCATION AND OPERATION

The Waianae Wastewater Treatment Plant (facility) is located on the southwestern coastal plain of the Island of Oahu, between Maili and Pokai Bay. The facility serves the communities of Waianae, Nanakuli, and Makaha.

The facility was upgraded to provide secondary treatment beginning in January 1996 for a design flow of 5.2 million gallons per day. The treatment of the liquid stream consists of bar screening, aerated grit removal, preaeration, sedimentation using the primary clarifiers, biological removal using trickling filters, and sedimentation using the final clarifiers.

Sludge from the final clarifiers is pumped back to the headworks and allowed to settle in the primary clarifiers where it is co-thickened with primary sludge. From there, the sludge is sent to the anaerobic digesters before the sludge is dewatered through centrifuges. The sludge is then taken to a landfill for final disposal.

Treated effluent is discharged into the Pacific Ocean through an ocean outfall, Outfall Serial No. 001. The outfall extends 6,184 feet from shore and discharges at a depth of 107.5 feet at latitude 21°25'36"N and longitude 158°12'01"W.

ZONE OF MIXING

The Zone of Mixing (ZOM) shall be established for the assimilation of secondary treated wastewater at a design flow of 5.2 MGD. The ZOM shall consist of a rectangular prism. The length and width of the rectangle at the surface of the receiving water are 746.0 feet and 218.5 feet, respectively. The ZOM extends from the surface of the receiving waters to the ocean bottom. The diffuser is centered on the longitudinal axis of the ZOM.

RECEIVING WATER DESIGNATION

The Pacific Ocean is classified by the Department of Health as Class A Dry Open Coastal Waters under Hawaii Administrative Rules (HAR), Section 11-54-06(b)(2)(B). The uses to be protected are all uses compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters.

These waters shall not act as receiving waters for any discharges which have not received the best degree of treatment or control compatible with the criteria established for this class.

OCEAN DISCHARGE CRITERIA

The Director of Health has considered the Ocean Discharge Criteria, established pursuant to Section 401(c) of the Clean Water Act for the discharge of pollutants into the territorial sea, the waters of the contiguous zone, or the oceans. The EPA has promulgated regulations for Ocean Discharge Criteria in 40 CFR Part 125, Subpart M. Therefore, the Director of Health has determined that the discharge will not cause unreasonable degradation to the marine environment. Based on current information, the Director of Health proposes to issue a permit.

DESCRIPTION OF THE PRESENT DISCHARGE AND RECEIVING WATERS

A. Discharge of Secondary Treated Wastewater Through Outfall Serial No. 001

The following is a quantitative description of the discharge reported in the current NPDES permit application.

Average Flow: 3.315 MGD
Maximum Flow: 4.213 MGD
Design Flow: 5.2 MGD

Parameter	Discharge Concentration		Units
	Maximum	Average	
Biochemical Oxygen Demand (5-day)	52	15	mg/l
Total Suspended Solids	22	11	mg/l
pH	7.57	6.83 (minimum)	Standard Units
Ammonia Nitrogen	9.6	3.71	mg/l
Kjeldahl Nitrogen	11.9	5.8	mg/l
Total Phosphorus	3.7	3.3	mg/l
Antimony	1	0.73	µg/l
Arsenic	1.9	1.5	µg/l
Beryllim	0.03	0.03	µg/l
Cadmium	0.23	0.23	µg/l
Chromium	5	3.7	µg/l
Copper	23	16.7	µg/l

Parameter	Discharge Concentration		Units
	Maximum	Average	
Lead	0.7	ND	µg/l
Mercury	Not Detected	Not Detected	µg/l
Nickel	5.1	4.2	µg/l
Selenium	1.5	1.4	µg/l
Silver	1.8	0.77	µg/l
Thallium	0.09	0.065	µg/l
Zinc	38	25.5	µg/l
Cyanide	53	52	µg/l
Acrolein	1.1	1.1	µg/l
Methlene Chloride	0.7	0.7	µg/l
Tetrachloro-Ethylene	0.51	0.51	µg/l
Bis (2-Ethylhexyl) Phthalate	1	1	µg/l
1,4-Dichlorobenzene	0.573	0.514	µg/l

B. Recreational Water Quality

The following is a quantitative description of enterococci (#/ml) in recreational waters reported in the 2002 Annual Assessment for the facility. The values were calculated as 12-month running geometric means.

Sampling Date		Monitoring Stations				
		WN1	WN2	WN3	WN4	WN5
1/8/02	Surface	1.00	1.00	1.10	1.22	1.06
	Bottom	1.14	1.00	1.03	1.05	1.07
2/12/02	Surface	1.00	1.03	1.05	1.24	1.00
	Bottom	1.15	1.03	1.03	1.08	1.00
3/8/02	Surface	1.00	1.04	1.06	1.30	1.00
	Bottom	1.35	1.04	1.04	1.10	1.00
3/14/02	Surface	1.00	1.04	1.06	1.29	1.00
	Bottom	1.33	1.04	1.04	1.10	1.00

Sampling Date		Monitoring Stations				
		WN1	WN2	WN3	WN4	WN5
3/20/02	Surface	1.00	1.04	1.06	1.27	1.00
	Bottom	1.31	1.04	1.04	1.09	1.00
3/26/02	Surface	1.00	1.09	1.05	1.26	1.00
	Bottom	1.30	1.03	1.03	1.09	1.00
4/2/02	Surface	1.04	1.12	1.07	1.00	1.00
	Bottom	1.24	1.04	1.04	1.04	1.00
4/8/02	Surface	1.04	1.11	1.07	1.00	1.00
	Bottom	1.23	1.04	1.04	1.04	1.00
4/14/02	Surface	1.04	1.10	1.06	1.00	1.00
	Bottom	1.21	1.04	1.04	1.04	1.00
5/8/02	Surface	1.04	1.11	1.07	1.00	1.00
	Bottom	1.23	1.04	1.04	1.04	1.00
6/6/02	Surface	1.04	1.11	1.07	1.00	1.00
	Bottom	1.23	1.04	1.04	1.04	1.00
7/24/02	Surface	1.04	1.11	1.07	1.00	1.00
	Bottom	1.23	1.04	1.04	1.04	1.00
8/6/02	Surface	1.04	1.11	1.07	1.00	1.00
	Bottom	1.23	1.04	1.04	1.04	1.00
9/5/02	Surface	1.04	1.11	1.07	1	1
	Bottom	1.23	1.04	1.04	1.04	1
10/22/02	Surface	1.04	1.11	1.07	1	1
	Bottom	1.23	1.04	1.04	1.04	1
11/4/02	Surface	1.04	1.11	1.07	1	1
	Bottom	1.23	1.04	1.04	1.04	1
12/4/02	Surface	1.04	1.11	1.07	1	1
	Bottom	1.15	1.04	1.04	1.04	1

D. Receiving Water Quality

The following is a quantitative description of the receiving water quality for 2002 reported in the 2002 Annual Assessment for the facility:

Parameter		Geometric Mean Not to Exceed the Given Value	Not to Exceed the Given Value More than Ten Percent of the Time	Not to Exceed the Given Value More than Two Percent of the Time
Total Nitrogen (µg/l)	Result	82	100	113
	WQS	110	180	250
Ammonia Nitrogen (µg/l)	Result	1.11	1.55	1.9
	WQS	2	5	9
Nitrate+Nitrite Nitrogen (µg/l)	Result	1.57	3.67	6.1
	WQS	3.5	10	20
Total Phosphorus (µg/l)	Result	6.94	8.55	9.8
	WQS	16	30	45
Chlorophyll a (µg/l)	Result	0.095	0.137	0.174
	WQS	0.15	0.5	1
Turbidity (NTU)	Result	0.101	0.172	0.238
	WQS	0.2	0.5	1
pH (Standard Unit)	Result	Minimum: 8.077		Maximum: 8.265
	WQS	7.6 - 8.6		

PROPOSED DETERMINATIONS

A. Effluent Limitations and Monitoring Requirements

The effluent limitations and monitoring requirements for Outfall Serial No. 001, specified in Part A of the draft permit, are based on technology-based effluent guidelines specified in 40 CFR Part 133, state water quality standards and water pollution control regulations specified in HAR, Chapters 11-54 and 11-55, and best professional judgement (BPJ).

1. Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and pH

   The effluent limitations for these parameters are based on 40 CFR Part 133, Secondary Treatment Regulations.

2. Total Nitrogen, Ammonia Nitrogen, Nitrate + Nitrite Nitrogen, Total Phosphorus, and Turbidity

   Although there are no limitations for total nitrogen, ammonia nitrogen, nitrate + nitrite nitrogen, and total phosphorus, performance-based threshold values were established to maintain plant efficiency. These threshold values are specified in Part E of the draft permit.

3. Whole Effluent Toxicity Limitations and Monitoring Requirements

   The whole effluent toxicity (WET) limitations are in accordance with 40 CFR Part 122.44(d) and are further explained in Part B of the draft permit. The purpose of the limitations and monitoring requirements is to measure effects of effluent toxicity on saltwater aquatic life.

   a. Short-Term Chronic Toxicity

      The draft permit requires short-term chronic toxicity testing because it measures the nonlethal effects of the effluent on test organisms. This is preferred to acute toxicity testing, which measures lethal effects, because the effluent may cause adverse effects to test organisms without being lethal.

      In accordance with HAR, Section 11-54-04(b)(4)(A), which relates to continuous discharges through submerged outfalls, the chronic toxicity limitation is based on the "no observed effect concentration" (NOEC). The chronic NOEC is the highest measured continuous concentration of an effluent or a toxicant that causes no observed effect on a test organism.

      The following equation has been used to calculate the permit limit for Chronic NOEC:

      NOEC = 100/initial dilution factor*
      = 100/117.84
      = 0.8486

      Toxicity = 100/NOEC
      = 100/.8486
      = 117.84 TU_c

* The dilution factor used in calculating the chronic toxicity limitation is based on the "worst-case scenario" dilution factor (117.84) found in the study Nearfield and Farfield Plume Analysis Waianae Ocean Outfall System (Edward K. Noda and Associates, Inc., October 1997).

b. Alternate Testing (Acute Toxicity Testing)

If after 15 months from the effective date of this permit, the Permittee demonstrates that the chronic toxicity tests cannot be performed reliably, the draft permit shall allow the Permittee to perform acute toxicity tests in lieu of the short-term chronic toxicity tests.

Acute toxicity is measured by the concentration of effluent that has a lethal effect on 50% of the test organisms.

The following equation has been used to convert the chronic toxicity limitation to an acute toxicity limitation:

LC_{50} = ACR x NOEC
= 10 x 0.8486
= 8.486

Toxicity = $100/LC_{50}$
= 100/8.486
= 11.78 TU_a

where an ACR (acute to chronic ratio) of 10 is used as recommended by EPA in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001, March 1991)

4. Enterococci

The draft permit requires monthly enterococci monitoring of the effluent. There are no limitations for enterococci. However, the Permittee must sample recreational waters to ensure that HAR, Section 11-55-08 requirements are met. Recreational area monitoring requirements are further explained in Part C of the draft permit and in Section B below.

5. Priority Pollutants

The draft permit requires annual monitoring of priority pollutants in order to characterize the nature of the effluent on an on-going basis. No limitations were

specified in the draft permit because of the small amount of industrial influent received by the facility. For the same reason, there is no regular monitoring of individual toxic parameters proposed in the draft permit.

B. Recreational Area Limitations and Monitoring Requirements

The recreational area limitations and monitoring requirements are specified in Part C of the draft permit and are based on HAR, Section 11-54-08, Specific Criteria for Recreational Areas.

C. Zone of Mixing Limitations Monitoring Requirements

The Zone of Mixing (ZOM) limitations and monitoring requirements are specified in Part E of the draft permit and are based on HAR Sections 11-54-04(a), 11-54-06(b)(3), 11-54-08, and 11-54-09. The standards specified in these sections shall be met at the boundary of the ZOM.

Part D of the draft permit also requires the Permittee to inspect the ocean outfall to ensure its proper operation.

D. Specific Water Quality Parameters Effluent Requirements

As mentioned above, performance-based threshold values for total nitrogen, ammonia nitrogen, nitrate + nitrite nitrogen, and total phosphorus were established to maintain plant efficiency and are specified in Part E of the draft permit.

Using data from the first two years of secondary treatment operation, upper 95% confidence limits were calculated and used along with BPJ to determine threshold values. The 95% confidence limit refers to a range where 95% of future values should be contained.

Exceedances of the threshold values would result in the Permittee increasing monitoring frequencies and initiating investigations to determine the cause of the exceedances. If exceedances continue, then the Permittee shall also implement a reduction evaluation plan.

E. Sludge Requirements

The sludge requirements are specified in Part F of the draft permit and are based on 40 CFR Parts 257, 258, and 503 and HAR, Chapters 11-58 and 11-62.

F. Pretreatment Requirements

The pretreatment requirements are specified in Part G of the draft permit and are based on 40 CFR Part 403.

G. Wastewater Pollution Prevention Program Requirement

The requirements for a wastewater pollution prevention program is specified in Part H of the draft permit. The intent of the program is to evaluate the present treatment and to ensure that the facility can provide adequate treatment in the future.